Jan. 15, 1929. 1,698,881

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METHOD AND APPARATUS FOR MIXING LONG FIBERED MATERIALS WITH POWDERY SUBSTANCES

Filed Feb. 5, 1925

Fig. 1

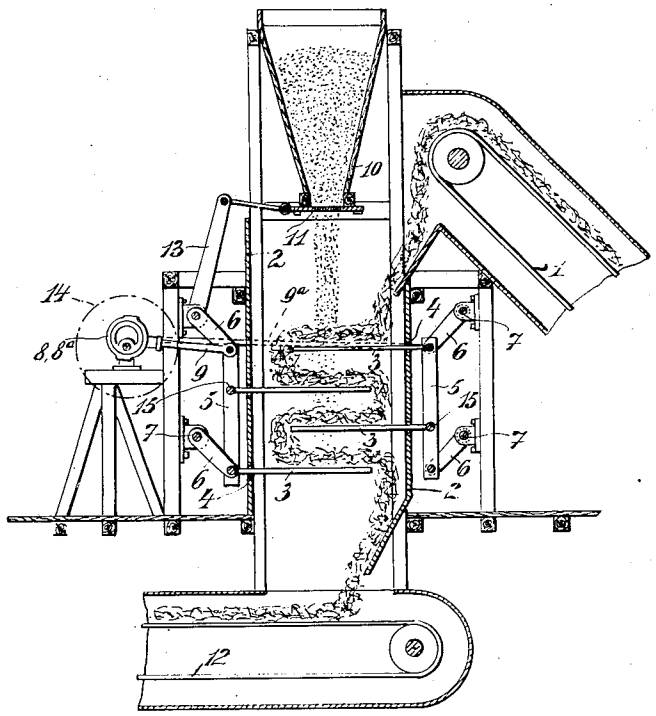
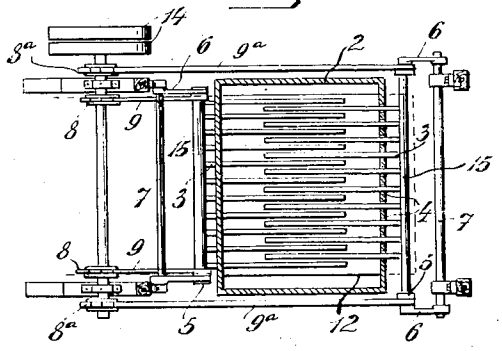


Fig. 2



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Patented Jan. 15, 1929. 1,698,881

UNITED STATES PATENT OFFICE.

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METHOD AND APPARATUS FOR MIXING LONG-FIBERED MATERIALS WITH POWDERY SUBSTANCES.

Application filed February 5, 1925, Serial No. 7,123, and in Austria November 4, 1924.

The invention relates to a method and apparatus for thoroughly mixing materials, which consist of long fibers, halms, stalks and the like with pulverulent substances, especially for mixing wood wool with cement, as e. g. the so-called sorrel-cement. It aims at obtaining an intimate mixture without injuring the fibers and in such manner, that the fibers are perfectly and uniformly covered by a layer of cement, but at the condition, that the loose structure of the fibrous material is not altered and particularly that the formation of cloggy lumps is prevented. Furthermore the invention aims at effecting an automatic cleansing of the operating members or utensils which are in immediate contact with the mixture, in order to maintain them constantly in good working condition. Finally the apparatus ought to be easily operated and ought to require little power.

According to the present invention for answering these requirements the fibrous material is in the form of a loose hank or skein moved along by jerks underneath of a device spreading the powdery body on the fibrous material. By the intermittent jerky movement it is obtained that the cement sprinkled on the fibrous material does not accumulate on the top fibers, but is uniformly distributed throughout the entire cross-section of the hank. Powdery material, which falls off from the latter, is directed so as to fall on another hank, which also advances by jerks and which had already been sprinkled once. Preferably this second sprinkling is effected on the side of the hank, which during the first sprinkling had been the lower one, for which purpose the hank is to be turned over. If repeated sprinkling of the top as well as of the underside of the same hank is intended, this can be effected by conveying the hank or skein below the spreading device in a serpentine path, the single windings of the hank being successively moved by jerks in opposite directions.

From the foregoing it elucidates, that the fibrous material is not worked through by tools or other means and that therefore injury to the fibers is prevented. They come only into touch with those parts of the apparatus, which provoke the jerky movement thereof. As transporting means answering perfectly these requirements rakes have been found to be most appropriate, on which the fibrous material is caused to fall and lay in the form of a loose hank. Owing to the movement in the one direction the prongs of the rake will find a resistance on some of the fibers and therefore will carry the hank with them. During their movement in the other direction the prongs slide on the fibers and thereby are cleansed from any material, which may have remained adherent to them.

In the accompanying drawing a mixing machine constructed according to the invention is illustrated by way of example, Fig. 1 showing a sectional elevation and Fig. 2 a sectional plan view thereof.

The loose hank, consisting for instance of wood wool, jute fibers, straw or the like, and preliminarily soaked with water or lye, is by means of a conveyor 1 introduced into the rectangular pit 2, in which several shoving- or shifting-elements 3, adapted to advance the hank by jerks in the one direction, but not in the other, are mounted one above the other at equal distances. These elements, hereinafter called "rakes" may have the form of a grate open on one side, that is to say the bars of which are not connected at the one end, or of a multi-pronged flat and smooth fork. The free ends or points of the prongs of these fork-like rakes are destinated to attack the hank in such manner as to push it on, when the rake is oscillating in the one direction, but to be withdrawn without moving the hank in the other direction, whilst the other ends are extending through holes 4, provided in opposite walls of the pit, outside the latter and are secured to the horizontal rails 15 of frames 5, thus forming the rakes. These rakes are arranged alternately so, that the one leaves a free space at the one side and the next rake at the other, thus creating a serpentine path for the passing of the loose hank.

The frames 5 are by means of links 6 piv-

otally suspended at 7 so as to be able of performing horizontally an oscillating movement. Each group of rakes, secured to the frame of the one side, is shaken so that its movement always takes place in the opposite direction of the other, these movements being obtained by means of the excentrics 8, 8^a and the connecting rods 9, 9^a. Above the pit a hopper 10 is mounted, at the lower end of which the spreading device 11 of any known type is placed. As is shown, this spreading device may be controlled by angle-levers 13 and the entire machine may be driven by pulleys 14 mounted on the shaft of the excentrics.

Owing to the oscillating movements of the rakes the hank entering through an aperture of the pits wall is moved on toward the free end of the top rake and at the latter end is bent and turned over so, that now its former top lies on the upper surface of the second rake. This turning over is repeated at each free end of the following rakes, the number of which is chosen such, that a perfect, thorough and uniform sprinkling of the hank is reliably assured, and that the entire powdery material discharged by the spreading device is taken up by the fibers.

By a conveyer 12, on which the fibrous material falls when leaving the last rake, the material is carried outside the pit.

As all the parts operating upon the rakes are arranged outside the space of the pit, where the sprinkling takes place, there is no risk of any disturbance being caused by the links or other parts being soiled.

What I claim is:

1. The method of mixing long-fibered materials with powdery substances, which method consists of advancing the fibrous material, brought into the form of a loose hank, by jerks and at the same time continuously spreading the powdery substance thereon.

2. The method of mixing long-fibered materials with powdery substances, which consists of advancing by jerks several loose hanks of fibrous material, arranged one below the other, in alternately opposite directions and at the same time continuously spreading the powdery substance thereon.

3. The method of mixing long-fibered materials with powdery substances, which consists in advancing by jerks a loose hank of the fibrous material in a serpentine path and at the same time continuously spreading the powdery substance thereon.

4. The method of mixing soaked wood wool with sorrel cement, which consists of advancing by jerks the wood wool brought into the form of a loose hank and soaked with lye, in a serpentine path and at the same time spreading the sorrel-cement on the upper part of the said hank.

5. A machine for mixing long-fibered materials with powdery substances, comprising a pit, a conveyor for the fibrous material discharging into the pit at its upper part, a conveyor underneath of the pit, several rakes arranged alternately within the pit one below the other, two members oscillating in opposite directions, to each of which a group of rakes is connected outside the pit, and a device for spreading the powdery material, this latter device being placed above the top-rake.

6. A machine for mixing long-fibered materials with powdery substances, comprising a pit, a conveyor for the fibrous material discharging into the pit at its upper part, a conveyor underneath of the pit, several rakes arranged alternately within the pit one below the other, two members oscillating in opposite directions, to each of which a group of rakes is connected outside the pit, rails placed outside the pit, to which rails the two groups of rakes are secured, levers, on which these rails are suspended, eccentrics with rods linked to the rails carrying the rakes, and a device for spreading the powdery material, this latter device being placed above the top-rake.

7. A machine for mixing long-fibered materials with powdery substances comprising a horizontally arranged rake-like grate, the perfectly smooth, parallel prongs of which are arranged in one plane only at their one end rigidly secured to a transversal bar, whilst the other ends are free and adapted to attack fibrous material so as to shift the latter in only one horizontal direction, means for oscillating the entire body of the grate in its own, substantially horizontal plane in the direction of the prongs length, and a mechanically actuated spreading device placed above the rake.

8. A machine for mixing long-fibered materials with powdery substances comprising a conveyor adapted for feeding fibrous material into the apparatus in the form of a loose hank, a horizontally arranged, rake like grate, the smooth, parallel prongs of which are arranged in one plane only at their one end rigidly secured to a transversal bar, whilst the other ends are free and adapted to attack fibrous material so as to shift the latter in only one horizontal direction, this grate being disposed beneath the discharge end of the conveyor, means for causing an oscillating movement of the said rake in its own, substantially horizontal plane in the direction of its prongs, and a mechanically actuated spreading device mounted above said rake.

9. A machine for mixing long-fibered materials with powdery substances comprising a conveyor adapted for feeding fibrous material in the form of a loose hank into the

apparatus, several horizontal rake-like grates with smooth prongs, the free ends of which prongs are adapted to attack and advance fibrous material in only one direction, these rakes being arranged one above the other and alternately in opposite direction so as to form two groups of rakes, means for causing an oscillating movement of each group in the substantially horizontal plane of its rakes, but in counter-movement to the other group, and a mechanically actuated spreading device mounted above the top rake.

In testimony whereof I have affixed my signature.

KONRAD ERDMANN.